Translation

PCT/JP2003/006401

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT882	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP2003/006401	International filing date (*day/month/year*) 22 May 2003 (22.05.2003)	Priority date (*day/month/year*) 02 October 2002 (02.10.2002)
International Patent Classification (IPC) or national classification and IPC F02M 25/07, F28D 7/16		
Applicant HINO MOTORS, LTD.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
21 November 2003 (21.11.2003)	20 May 2004 (20.05.2004)
Name and mailing address of the IPEA/JP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP2003/006401

I. Basis of the report

1. With regard to the **elements** of the international application:*

☒ the international application as originally filed

☐ the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the claims:

pages _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the drawings:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

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IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

☐ restricted the claims.

☒ paid additional fees.

☐ paid additional fees under protest.

☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

☐ complied with.

☒ not complied with for the following reasons:

A matter common for claims 1-6 is that a bypass channel for cooling water is provided in a shell in order to prevent the stagnation of cooling water in the shell in an EGR cooler of a shell-and-tube type.

However, as described in claims 7-10, in the EGR cooler of a shell-and-tube type, the pitch between the tubes disposed on multiple concentric circles gradually increases with the transition from the positions on the external circle to the position on the internal circle, and the pitch between the circles gradually changes from the outer side in the radial direction to the center, thereby increasing the flow of cooling water on the circumference of tubes on the central side.

Further, a matter common for claims 1-10 is the EGR cooler of a shell-and-tube type, but this was disclosed in document [JP, 11-036995, A (Isuzu Motors Limited), 09 February, 1999, Figs. 1-9] and document [JP, 2000-045884, A (Hino Motors, Ltd.), 15 February, 2000, Figs. 1-4]. Therefore, this common matter is not a special technical feature in the sense of the second sentence of PCT Rules 13.2.

It follows from the above-described that there is no common matter for all the claims. Furthermore, there is no common task for all the claims, and the inventions of all the claims cannot be considered as a group of inventions so linked as to form a single general inventive concept.

The following ranges are considered by the IPEA as satisfying the requirement relating to unity of inventions.

Claims 1-6

Claims 7-10

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

☒ all parts.

☐ the parts relating to claims Nos. _____

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	2-10	YES
	Claim	1	NO
Inventive step (IS)	Claims		YES
	Claims	1-10	NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims		NO

2. Citations and explanations

Document 1: JP, 2000-283666, A, 13 October, 2000
Document 2: JP, 2000-292089, A, 20 October, 2000
Document 3: WO, 00/43663, A, 27 July, 2000
Document 4: JP, 01-300192, A, 04 December, 1989
Document 5: JP, 53-078470, A, 11 July, 1978 ✓
Document 6: JP, 48-019178, Y, 31 May, 1973
Document 7: JP, 05-203388, A, 10 August, 1993
Document 8: JP, 2000-213424, A, 02 August, 2000 ✓equiv of Doc 3

The invention of claim 1 does not appear to possess novelty or involve an inventive step based on document 1 and document 2 cited in the ISR.

Forming a space in the lower part inside the shell and providing a channel for eliminating the stagnation of cooling water in the EGR cooler of a shell-and-tube type is disclosed in document 1, page 3, left column, line 7 to line 10, and Figs. 1-3. Further, providing a notch for preventing the stagnation of water in the corners of the water passage is disclosed in document 2, page 4, left column, line 37 to the same page, right column, line 20 and FIGS. 1, 4-9.

The inventions of claims 2-6 do not appear to involve an inventive step based on document 1, document 2, document 3 cited in the ISR, document 4 cited in the ISR and newly cited document 5.

Providing a bypass outlet for purging part of the cooling water for eliminating the stagnation of the cooling water in the EGR cooler of a shell-and-tube type is disclosed in document 3.

Further, a heat exchanger of a shell-and-tube type in which tube-side fluid flows from the jacket material through the bypass region and the bypass region connects the inlet nozzle on the body side to the outlet nozzle on the body side is shown in FIG. 3 of document 4.

Further, forming a convex portion on the wall surface of the shell in a heat exchanger of a shell-and-tube type is shown in FIG. 2 of document 5.

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of Box V:

The inventions of claims 7-10 do not appear to involve an inventive step based on document 1, document 2, and documents 6 and 7 cited in the ISR, and newly cited document 8.

Disposing tubes in the form of multiple concentric circles around an axial line of the shell in a heat exchanger of a shell-and-tube type and increasing the pitch between the tubes arranged in a circle with the transition to the inner peripheral section is described in document 6, page 1, right column, line 19 to page 2, right column, line 4 and shown in FIG. 2 and FIG. 3.

Furthermore, disposing tubes in the form of multiple concentric circles around an axial line of the shell in a heat exchanger of a shell-and-tube type and increasing the pitch between the circles with the transition to the inner peripheral section is shown in FIG. 1 of document 7.

Furthermore, disposing tubes in the form of multiple concentric circles around an axial line of the shell in an EGR cooler of a shell-and-tube type is described in claim 3 and shown in FIG. 3 of document 8.